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Differences in use of Veterans Health Administration and non-VHA Hospitals by Rural and Urban Veterans After Access Expansions

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Abstract

Purpose: To examine changes in rural and urban Veterans' utilization of acute inpatient care in Veterans Health Administration (VHA) and non-VHA hospitals following access expansion from the Veterans Choice Act, which expanded eligibility for VHA-paid community hospitalization.

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Methods: Using repeated cross-sectional data of VHA enrollees' hospitalizations in 9 states (AZ, CA, CT, FL, LA, MA, NY, PA, SC) between 2012–2017, we compared rural and urban Veterans' probability of admission in VHA and non-VHA hospitals by payer over time for elective and non-elective hospitalizations using multinomial logistic regression to adjust for patient-level sociodemographic features. We also used generalized linear models to compare rural and urban Veterans' travel distances to hospitals.

Findings: Over time, the probability of VHA-paid community hospitalization increased more for rural Veterans than urban Veterans. For elective inpatient care, rural Veterans' probability of VHA-paid admission increased from 2.9% (95% CI 2.6–3.2%) in 2012 to 6.5% (95% CI 5.8–7.1%) in 2017. These changes were associated with a temporal trend that preceded and continued after the implementation of the Veterans Choice Act. Overall travel distances to hospitalizations were similar over time; however, the mean distance traveled decreased from 39.2 miles (95% CI 35.1–43.3) in 2012 to 32.3 miles (95% CI 30.2–34.4) in 2017 for rural Veterans receiving elective inpatient care in VHA-paid hospitals.

Conclusions: Despite limited access to rural hospitals, these data demonstrate an increase in rural Veterans' use of non-VHA hospitals for acute inpatient care and a small reduction in distance traveled to elective inpatient services.

INTRODUCTION

Nearly 1 in 4 Veterans reside in rural or highly rural communities where access to care is often limited.[1–3] To improve access to care for these Veterans, Veterans Health Administration (VHA) pioneered the use of telemedicine and operates hundreds of community-based outpatient clinics (CBOCs) that provide primary care and some specialty care.[4–6] While these strategies have increased access to outpatient care, rural Veterans face limited options for acute inpatient care. In 2015, only 19 of 144 VHA hospitals were located in rural areas across 18 states.[7]

Capital cost requirements make it financially infeasible for VHA to build new rural hospitals, so Veterans often rely on non-VHA hospitals for inpatient care. Most VHA enrollees (80%) have additional public or private health insurance coverage, which they may use to access care in non-VHA hospitals.[8] Historically, VHA policies have also allowed Veterans to receive covered care in non-VHA hospitals in cases of medical emergencies.[9–11] Nonemergent care in non-VHA facilities could also be preauthorized if needed services were not available at local VHA facilities or care was geographically inaccessible.[12]

In response to concerns surrounding excessive wait times for VHA care, the Veterans Access, Choice, and Accountability Act of 2014 was enacted, and the Veterans Choice Program was established.[13] Previously, authorizations for care were approved locally on a case-by-case basis, and the act codified eligibility based on wait time (over 30 days) and driving distance (more than 40 miles to the nearest VHA facility) criteria. Approximately 28% of rural Veterans would have qualified for VCP based on distance alone in 2013.[3] As a temporary program, the VCP was later replaced by the Veterans Community Care Program (VCCP) under the VA Maintaining Internal Systems and Strengthening Integrated Outside Networks (MISSION) Act of 2018.[14]

The MISSION Act was followed shortly by the beginning of the Coronavirus Disease 2019 Public Health Emergency (COVID-19) which led to a dramatic decrease in non-COVID-19 admissions, which materially complicates studies evaluating the effects of the MISSION Act. In this study, our objective was to determine the effect of the VCP on the setting and payer of rural Veterans' acute inpatient care, which can provide useful context for changes associated with expanded VHA coverage absent the effects of the pandemic. We also examined the effect of the VCP on distance traveled by rural and urban Veterans, as the VCP specifically expanded coverage for Veterans living 40 miles from their nearest VHA facility. Studies of outpatient utilization found the greatest uptake of VHA-purchased primary care in rural and highly rural counties and improved wait times for rural Veterans through VCP, but expanded coverage could have distinct effects on inpatient utilization. As rural hospital close entirely or eliminate inpatient services, rural patients are left with limited options for hospital care.[17–19] In addition, perceptions of quality may cause rural Veterans to bypass local rural hospitals and seek care outside of their community when given a choice.[20]

We hypothesized that rural Veterans would have greater use of VHA-paid community hospitals than their urban counterparts given the overall limited number of VHA hospitals located in or near rural communities. We expected travel distances to decrease with expanded access to local non-VHA hospitals, as Veterans live closer to non-VHA hospitals than VHA hospitals on average.[21] Because VHA policy prior to VCP included coverage of non-VHA services in cases of medical emergencies,[9,11] we expected the VCP to have larger effects on elective care.

METHODS

Data and Sample

Because Veterans may have multiple forms of health insurance coverage, we linked VHA inpatient records from the VA Corporate Data Warehouse (CDW) Inpatient Encounter files to all-payer discharge data obtained from state health agencies using personal identifiers. This linkage allowed us to capture VHA enrollees' utilization of acute inpatient services within and outside of VHA. The resulting sample included all medical/surgical VHA and non-VHA hospitalizations by Veterans enrolled in VHA in nine states (AZ, CA, CT, FL, LA, MA, NY, PA, and SC) at any time in calendar years 2012 to 2017 (Figure 1). Patient-level sociodemographic characteristics, including age, gender, race/ethnicity, marital status, priority group, rurality, and state of residence, were obtained from the Assistant Deputy Under Secretary for Health (ADUSH) Enrollment Files, which contain data on enrollment and eligibility, and the VA Observational Medical Outcomes Partnership (OMOP) Files.[22] VHA priority groups affect Veterans' required copays and are assigned based on history of military service, disability rating, income, Medicaid eligibility, and receipt of other Veteran benefits.[23] Veterans' home addresses and VHA hospital addresses were obtained from the Geospatial Services Support Center Files, and non-VHA hospital addresses were obtained from the Centers for Medicare and Medicaid Services (CMS) Provider of Service file. The study was approved by Stanford University, University of Utah, and Greater Los Angeles VA Institutional Review Boards.

Dependent Variables

The primary outcome in this study was the hospital setting and payer of each Veteran's admission: 1. VHA hospital, 2. non-VHA hospital covered by Medicare, 3. non-VHA hospital covered by Medicaid, 4. non-VHA hospital covered by commercial insurance, 5. non-VHA hospital covered by VHA, or 6. non-VHA hospital covered by other payers. Records of all VHA admissions were included in the CDW Inpatient file. Records of admissions in non-VHA hospitals, including primary payer information (i.e., Medicare, Medicaid, commercial insurance, and other sources), were obtained from state discharge data. Additionally, VHA payment for non-VHA admissions were identified through VHA claims. As a secondary outcome, the straight-line distance between each Veteran's address and hospital address was computed based on latitude and longitude. If latitude and longitude were not available for a Veteran or hospital address, the distance was calculated using the centroid of the ZIP code.

Independent Variables

The primary predictors of interest were rural residence and the onset of the VCP (set to its first full year in 2015, shortly after implementation in November 2014). Rurality was obtained from the U.S. Department of Agriculture's rural-urban continuum codes.[24] Patient-level sociodemographic characteristics included age, gender, race/ethnicity, marital status, VHA care eligibility priority group, and state as covariates. We also included an indicator of whether an admission was elective or non-elective. This information was obtained directly from discharge records reported on billing forms from the relevant state agencies. VHA data did not specify whether admissions were elective, so we generated values for VHA admissions using a probabilistic approach based on non-VHA admissions. For non-VHA admissions, we calculated the proportion of elective admissions associated with each combination of Diagnosis Related Group (DRG) and primary diagnosis code. For VHA admissions with the same DRG/primary diagnosis code combinations, we then generated values of the elective indicator using these specified probabilities with a random Bernoulli distribution. A list of DRG/primary diagnosis combinations with the highest proportions of elective admission is included in Appendix Table 1.

Statistical Analysis

We first compared patients' sociodemographic characteristics by calculating standardized mean differences between rural and urban Veterans.[25] Standardized mean differences of ≥10% indicated an imbalance between groups.[26] In multivariable analysis, we used hospital admission as the unit of analysis. We compared the odds of a hospital admission occurring under each of the six specific setting/payers using multinomial logistic regression. Non-VHA hospitals paid by Medicare were the reference group. Rural residence and an indicator representing the onset of the VCP in 2015 were included as primary predictors.

We included the calendar year as a continuous measure to account for linear trends preceding and following the VCP. We included an indicator of whether an admission was elective as we expected this to influence Veterans' choice of hospital (i.e., Veterans would be brought to the nearest hospital regardless of VHA affiliation during medical emergencies). Two-way, three-way, and four-way interactions between rurality, the elective

indicator, continuous year, and the VCP indicator were included. We also included an indicator for whether an admission took place in a state and year following Medicaid expansion. The model was adjusted for patient-level sociodemographic characteristics. We included a fixed effect for enrollees' state of residence. Age was included in the models as a continuous measure centered at 65 years along with a binary indicator of whether a patient was ≥65 years, reflecting the age of Medicare eligibility. To account for non-linearity in the relationship between age and setting/payer of hospitalization, we included linear, quadratic, and cubic terms for centered age as well as interactions between these terms and the Medicare age-eligibility indicator. For missing sociodemographic values, we carried forward patients' last observed values if recorded previously. We then carried backward observed values if characteristics were available in later encounters. A total of 20,572 Veterans (1.6%) with 42,826 admissions (1.2%) were excluded from multivariate analysis due to missing sociodemographic characteristics.

Robust standard errors were calculated using a clustered sandwich estimator to account for within-patient correlation (as each Veteran could have multiple hospitalizations).[27] For interpretation of the results, we computed the average marginal effects of the VCP and year for rural and urban Veterans for elective and non-elective admissions. We also estimated predicted probabilities of admission under each setting/payer for years 2012 and 2017 and plotted predicted probabilities of admission to a given hospital type in each year to examine overall trends.

To compare travel distances based on rurality, we used generalized linear models with a gamma distribution. We limited these comparisons to hospitalizations paid for or provided by VHA since the VCP would mainly impact travel distance for these hospitalizations. Each model was adjusted for patient-level sociodemographic characteristics and included the same interaction terms used in the models predicting the setting/payer of care. The distribution of travel distances was highly skewed, and we excluded extreme outliers with travel >370 miles (corresponding to distances greater than the 99.9th percentile) as well as travel of 0 miles (corresponding to the 0.1st percentile).

Sensitivity Analyses

In addition to the multinomial logistic model used to examine the likelihood of admission under each setting/payer, we used two series of generalized linear models predicting binary outcomes (i.e., a specific setting/payer versus all others). The first series of regressions used the binomial distribution and logit link, and the second series used the Poisson distribution with a log link. The Akaike Information Criterion (AIC) was lower for the models using the binomial distribution than for models using the Poisson distribution. Predicted probabilities from the multinomial logistic model were similar to those estimated with generalized linear models using the binomial distribution, so we report the results of the multinomial logistic model for the analysis of setting/payer.

RESULTS

Sample Patient Characteristics

The cohort included 1,302,819 Veterans with 3,604,674 acute inpatient hospitalizations in nine states from 2012 to 2017. Using each Veteran's first admission in the data set, approximately 1 in 4 (25%) Veterans resided in a rural area (Table 1). The mean age was 70 years (SD 15) and 95% were male. Most patients were non-Hispanic White (74%), and 12% were non-Hispanic Black, 5% Hispanic, 3% other race, and 6% unknown. Most Veterans were currently married (56%) or divorced/widowed (33%). By priority group (where a lower number signifies a higher priority for VHA care), 27% belonged to groups 1–2, 16% to groups 3–4, 28% to groups 5–6, and 29% to groups 7–8. Florida (24%) and California (22%) had the largest number of Veterans in the sample, while Connecticut had the fewest (3%).

Age, sex, and priority group were similar for rural and urban residence (std. diff. <10%). Rural residence, however, was associated with a significant difference in distribution across states (std. diff. 51%). For example, a large proportion of admitted Veterans lived in rural areas in South Carolina (45%) and Louisiana (43%). In contrast, a much smaller share of Veterans lived in rural areas in Massachusetts (10%), Connecticut (15%), and Florida (18%). Race/ethnicity also varied significantly by rural residence (std. diff. 31%). Non-Hispanic White Veterans represented 83% of those with rural residence compared to 71% of those with urban residence. Non-Hispanic Black Veterans represented only 7% of those with rural residence compared to 14% of those with urban residence. Marital status also varied significantly based on rural residence (std. diff. 17%), with 61% of rural Veterans currently married compared to 54% of urban Veterans.

Unadjusted Comparisons of Admission Setting/Payer by Rurality

Over half of all Veterans' admissions took place in non-VHA hospitals paid by Medicare, and rural Veterans had slightly more use of Medicare-covered hospitalizations than urban Veterans (Table 2). VHA was responsible for the second largest share with approximately one-quarter of Veterans' admissions, while commercial insurance, VHA-paid community care, and Medicaid each accounted for small fractions of inpatient care. After the VCP, small differences were noted: VHA's share of Veteran admissions decreased for both urban (−1.9%) and rural (−1.3%) Veterans, while VHA-paid community admissions increased for urban (+1.0%) and rural (+1.4%) Veterans. Admissions paid by commercial insurance decreased for urban (−0.8%) and rural (−0.9%) Veterans, while admissions paid by Medicaid increased for urban (+0.2%) and rural (+0.3%) Veterans.

Adjusted Odds of Hospitalization Under Each Setting/Payer

The predicted probabilities of admission under each setting/payer in 2012 and 2017 following adjustment for patient-level sociodemographic characteristics are shown in Table 3. The separate marginal effects of the VCP, yearly trend, and Medicaid expansion for each outcome are included in Appendix Table 2. Overall, rural and urban Veterans' probabilities of admission under each setting/payer followed similar trajectories. For both groups, the probability of admission in VHA hospitals and non-VHA hospitals paid by commercial

insurance decreased over time, while the probability of admission in non-VHA hospitals paid by Medicare, VHA, and Medicaid increased over time. Small differences in the magnitude of these changes were observed based on rurality and whether admission was for elective or non-elective care.

Overall, the largest relative change was observed in rural Veterans' probability of VHA-paid community admission for elective care (Figure 2) with the predicted probability more than doubling from 2.9% (95% CI 2.6–3.2) in 2012 to 6.5% (95% CI 5.8–7.1) in 2017. During the same span, urban Veterans' probability of VHA-paid community admission for elective care increased from 2.8% (95% CI 2.7–3.0) to 5.3% (95% CI 5.0–5.7). These changes were associated with positive time trends in elective VHA-paid community admissions for both urban and rural Veterans (+0.4 to 0.6% per year).

Smaller but notable changes were also observed in Veterans' probability of admission in non-VHA hospitals paid by Medicaid for elective care with the predicted probability increasing from 1.1% (95% CI 1.0–1.3) in 2012 to 1.8% (95% CI 1.6–2.1) in 2017 for rural Veterans. Urban Veterans' probability of Medicaid-paid admission for elective care also increased but to a lesser degree. These changes were associated with small significant time trends (+0.1 to 0.2% per year) independent of Medicaid expansion (+0.4 to 0.5%).

The probability of admission in non-VHA hospitals paid by commercial insurance decreased more for urban Veterans than rural Veterans. For urban Veterans, the probability decreased from 9.3% (95% CI 9.0–9.6) in 2012 to 7.6% (95% CI 7.3–7.8) in 2017 for elective care. For rural Veterans, the probability decreased from 8.1% (95% 7.6–8.5) to 7.3% (95% CI 6.9–7.7) for elective care during the same span. The time trend was significant only for urban Veterans (−0.4%/year) and in the opposite direction of the independent effect of Medicaid expansion (+0.6%).

Travel Distance

Veterans who lived more than 40 miles from the nearest VHA medical facility with a full-time primary care physician became eligible for VHA-paid community care through the VCP. Overall mean travel distances to hospitals were similar before and after the implementation of the VCP (Table 2). Compared to other settings, Veterans traveled furthest for hospitalizations within VHA and traveled the shortest distances to non-VHA hospitals paid by Medicare. Travel distances for rural Veterans were approximately 2-fold greater than travel distances for urban Veterans across settings and payers. Travel distances to elective admissions were consistently greater than travel distances to non-elective admissions.

Adjusted Travel Distance

For elective admissions (e.g., hip or knee replacement), rural Veterans with VHA-paid community hospitalizations had a small decrease in predicted mean travel distance over time, from 39.2 miles (35.1–43.3) in 2012 to 32.3 miles (30.2–34.4) in 2017. The predicted mean travel distances to VHA-paid community hospitalizations are shown in Figure 3. For rural Veterans, this decline was associated with an independent negative time trend (−1.3 miles per year). The VCP had no significant effect on the distance to VHA-paid community

hospitalizations. Travel distance remained unchanged for non-elective admissions to non-VHA community hospitals during the study period.

Overall, predicted mean travel distances to VHA admissions were similar during the study period except for a small increase in distance for urban Veterans receiving non-elective care. The predicted distance increased from 21.5 miles (95% CI 21.2–21.8) in 2012 to 23.4 miles (95% 22.9–23.8) in 2017. This change was associated with an independent time trend (+0.3 miles per year) as the VCP had no significant effect on distance to VHA admissions.

DISCUSSION

In this longitudinal study of Veterans' acute inpatient care, we found small but significant differences in rural and urban Veterans' utilization of VHA-paid community hospitals. While the probability of using VHA-paid community hospitals increased for both groups, the changes were larger for rural Veterans with the probability increasing 2.2-fold for elective admissions and 1.2-fold for non-elective admissions during the study period. These changes reflected an existing trend of growth in the community care program which preceded the VCP.[12]

This data demonstrating rural Veterans' increased uptake of VHA-purchased hospital services aligns with an observed trend of increased community-based primary care among rural Veterans,[15] and provides evidence that rural Veterans can access care closer to home. It is possible that expansion of VHA-purchased outpatient services increased the likelihood that Veterans were referred to community hospitals. A mixed-methods study of rural Veterans' barriers to care found that interviewees expressed confusion about whether non-VHA emergency services would be covered despite established requirements for VHA to cover this type of care, which contributed to unnecessary delays or undue avoidance of care.[28] Many participants in an earlier focus group reported that they would use community hospitals if VHA covered the cost and identified improved access and increased choice as benefits of purchased care.[29]

Although use of VHA-paid hospitals increased for rural Veterans, we found only a modest decrease in travel distance for those receiving elective care. Although some Veterans encountered inappropriate coverage denials in the past,[30] care in non-VHA hospitals for medical emergencies was a covered benefit for the most part prior to VCP,[9,10] so the lack of differences in travel for non-elective care was expected. We expected travel distance to elective care to decrease as living 40-miles from the nearest VHA facility with a full-time primary care physician made Veterans eligible for VCP, and Veterans typically live closer to non-VHA hospitals than VHA hospitals.[21] Travel distance only improved to a small degree, however, and the mean travel distance for VHA-paid elective care still exceeded 30 miles, indicating that these Veterans were still leaving their local market/community.

Veterans have reported many reasons why they might prefer closer care, including the time and cost spent on transportation as well as difficulty tolerating extended travel when in poor health.[28] The lack of a larger reduction in travel distance to hospitals for rural Veterans may reflect the fact that many rural hospitals lack the capability to perform elective inpatient

procedures (e.g., knee arthroplasty). When care is not emergent or time sensitive, it may be in the best interest of the Veteran to travel to higher volume facilities with more resources, especially for conditions where there is an established relationship between volume and health care quality.[31]

Our findings differ from a prior study that found rural Veterans relied more on VHA hospitals than urban Veterans,[32] as we found that rural Veterans were less likely than urban Veterans to be admitted to VHA hospitals. The prior study utilized all-payer data from many of the same states included in the current study but used data from 2004 to 2007 when total spending on VHA-purchased care was significantly lower. Spending on VHA-purchased care doubled from $2.2 billion in 2007 to $4.5 billion in 2012,[33] and it is likely that increased VHA purchasing contributed to rural Veterans' shifting reliance to non-VHA hospitals.

Medicaid expansion was associated with similar effects on rural and urban Veterans' probability of using VHA hospitals and non-VHA hospitals under all payers. A previous study limited to Veterans age 18–64 found that rural and urban Veterans had varied changes in health insurance coverage during the first year of the Affordable Care Act.[34] Rural Veterans increased coverage through Medicaid or directly purchased private insurance while urban Veterans increased coverage largely through employer-sponsored insurance. Because Veterans often hold multiple forms of health insurance coverage, however, these changes in insurance coverage may not translate directly into changes in how Veterans utilize their coverage. For example, Veterans' decision to use VHA care may be influenced by difference in copays determined by service-connectedness. Non-VHA hospitals and providers may also vary in whether they accept Medicaid, which is associated with lower payment rates,[35] so Veterans may need to utilize other forms of insurance to access certain types of care (e.g., elective surgery).

Limitations

We did not have all-payer discharge data beyond calendar year 2017 to examine VHA and non-VHA utilization for all payers during the MISSION era, so these data may not be generalizable to Veterans currently accessing inpatient care. There are limited data on changes in utilization following the MISSION Act as these studies are currently underway. In addition, utilization of inpatient care for elective admissions is complicated by the marked disruption of usual care practices caused by the COVID-19 pandemic. Prior to the VCCP's launch, the Congressional Budget Office anticipated that community referral rates under the VCCP and VCP would be similar despite the changes to eligibility, specifically naming the limited size and accessibility of community care networks in rural areas as an important factor.[36]

Our data only include admissions from nine states, so our findings may not be representative of care for Veterans across the United States, although approximately 33% of VHA enrollees lived in these states. Our data also included three calendar years preceding and following the implementation of the VCP, so it is difficult to isolate the effect of the VCP from prevailing time trends and Medicaid expansion. While state discharge data did include information on whether an admission was elective versus non-elective, we did not have

consistent information regarding Veterans' arrival to the hospital (i.e., whether a Veteran was brought by ambulance or directed to an emergency department from an outpatient clinic), which could affect Veterans' capacity to choose their setting of care. In addition, for Veterans admitted to non-VHA hospitals through the VCP, we did not have information regarding the reason for non-VHA care (i.e., excessive wait times and travel distance versus availability of services). We also measured distance as a straight line, which could differ from driving distance (the criteria used for the VCP), so these distances should be interpreted as approximate. Although the assignment of priority group can be affected by income, we did not have individual-level financial information (e.g., annual household income, private insurance coverage) which could affect Veterans' ability to access care outside of VHA.

CONCLUSION

Rural Veterans account for a sizable portion of VHA's enrolled population and face unique challenges in accessing care. VHA's community care program is aimed at improving access for Veterans, including rural Veterans who often must travel long distances to VHA facilities. These data demonstrate that rural Veterans increasingly used VHA-paid community hospitals for acute inpatient care, at locations that still involved leaving their local communities. These findings have direct implications for the MISSION Act and its impact on rural Veterans. Once hospitals recovered from pandemic-related disruptions to elective care and temporary government financial support mechanisms ended, it is likely that some of the patterns for rural Veterans we observed such as greater use of VA-purchased care have continued during the MISSION era.[37–42] However, many rural hospitals have closed since the end of our study period, so there may be a more limited shift to non-VHA inpatient care for rural Veterans compared to urban Veterans. More data are needed to understand health outcomes and patient experiences in community hospitals as more Veterans seek care in the community.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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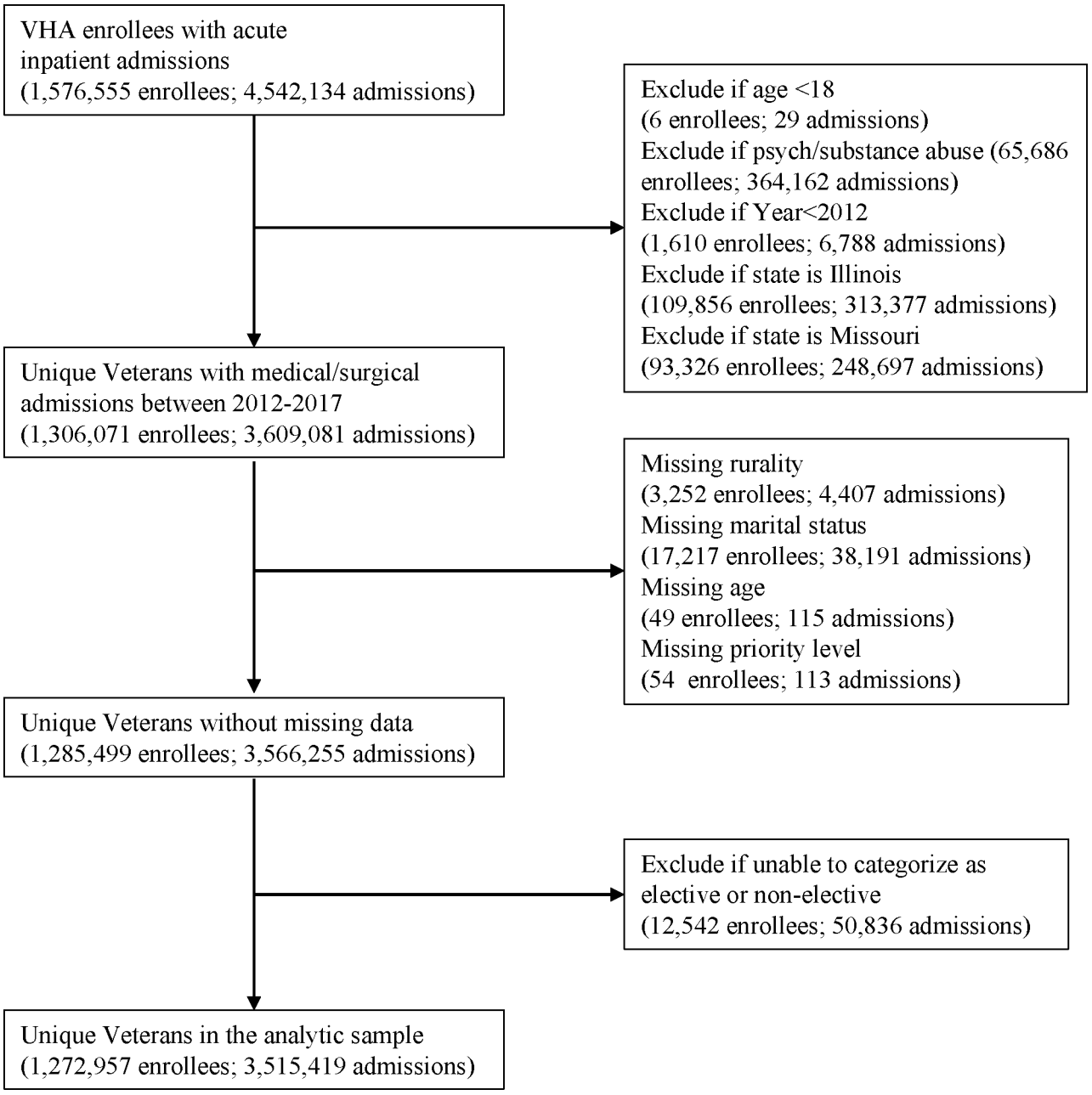

Figure 1.
Study Flowchart

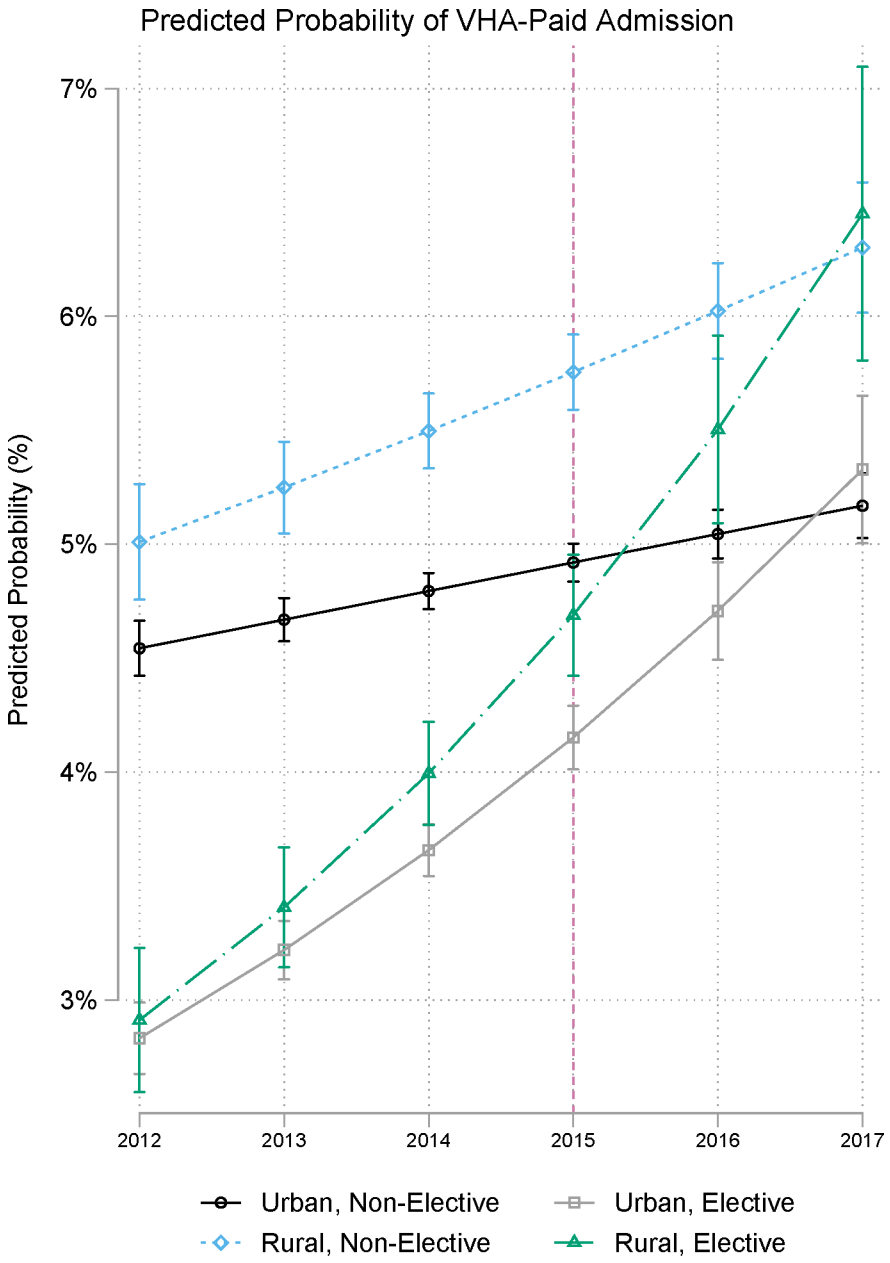

Figure 2.
Predicted Probability of VHA-Paid Admission

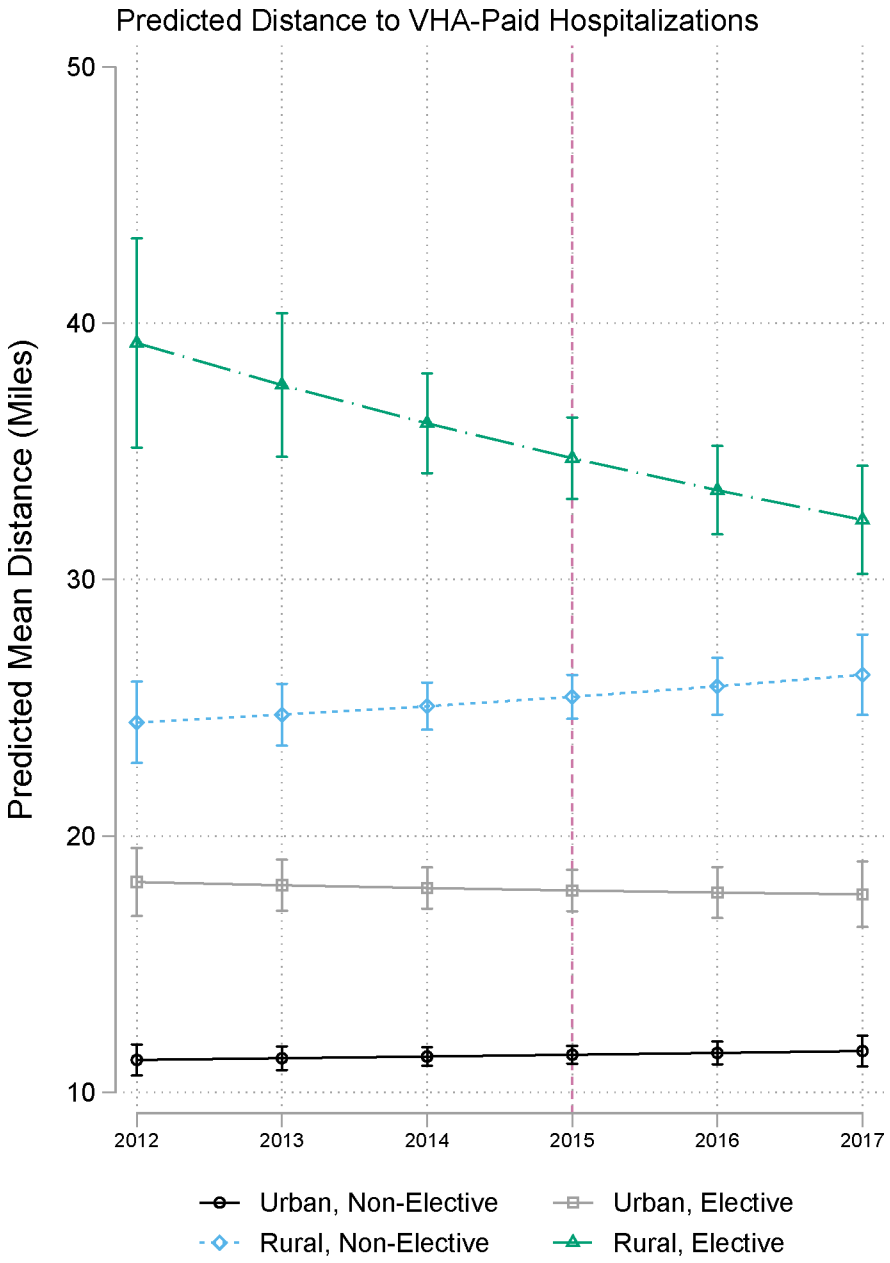

Figure 3.
Predicted Distance to VHA-Paid Hospitalizations

Table 1.

Patient Characteristics, Setting/Payer of Inpatient Care, and Distance to Hospitals

		Urban	Rural	Std. Diff.	Overall
Total No. of Veterans		977358 (75%)	325461 (25%)		1302819
Age, mean (std. dev.)		70 (15)	70 (14)	−3%	70 (15)
	Missing, No. (%)	52 (0%)	5 (0%)	0.7%	57 (0%)
	Age ≥65y, No. (%)	660652 (68%)	229834 (71%)	6%	890486 (68%)
Gender, No. (%)					
	Male	921539 (94%)	310733 (96%)	5%	1232272 (95%)
	Female	55819 (6%)	14728 (4%)		70547 (5%)
Race/Ethnicity, No. (%)					
	Non-Hispanic White	695826 (71%)	269745 (83%)	31%	965571 (74%)
	Non-Hispanic Black	133664 (14%)	21451 (7%)		155115 (12%)
	Hispanic	61160 (6%)	9279 (3%)		70439 (5%)
	Other	30934 (3%)	6938 (2%)		37872 (3%)
	Unknown	55774 (6%)	18048 (6%)		73822 (6%)
Marital Status, No. (%)					
	Married	533111 (54%)	199266 (61%)	17%	732377 (56%)
	Divorced or Widowed	324248 (33%)	100258 (31%)		424506 (33%)
	Single	106641 (11%)	22078 (7%)		128719 (10%)
	Unknown	13358 (1%)	3859 (1%)		17217 (1%)
Priority group, No. (%)					
	1–2	260535 (27%)	87385 (27%)	4%	347920 (27%)
	3–4	163429 (17%)	49571 (15%)		213000 (16%)
	5–6	269658 (28%)	93994 (29%)		363652 (28%)
	7–8	283695 (29%)	94498 (29%)		378193 (29%)
	Missing, No. (%)	41 (0%)	13 (0%)		54 (0%)
State, No. (%)					
	Arizona	68525 (7%)	28257 (9%)	51%	96782 (7%)
	California	240485 (25%)	51340 (16%)		291825 (22%)
	Connecticut	32819 (3%)	5938 (2%)		38757 (3%)
	Florida	255153 (26%)	57642 (18%)		312795 (24%)
	Louisiana	32488 (3%)	24542 (8%)		57030 (4%)
	Massachusetts	51055 (5%)	5918 (2%)		56973 (4%)
	New York	132190 (14%)	52275 (16%)		184465 (14%)
	Pennsylvania	122561 (12%)	65267 (20%)		187828 (14%)
	South Carolina	42082 (4%)	34282 (10%)		76364 (6%)
Setting/Payer, No. (%)					
	Medicare	504165 (52%)	179300 (55%)	12%	683465 (52%)
	VHA	244830 (25%)	66944 (21%)		311774 (24%)

		Urban	Rural	Std. Diff.	Overall
	Commercial	88243 (9%)	29834 (9%)		118077 (9%)
	VHA-Paid	48108 (5%)	15642 (5%)		63750 (5%)
	Medicaid	19694 (2%)	5405 (2%)		25099 (2%)
	Other	72318 (7%)	28336 (9%)		63750 (8%)
Distance to Hospital in Miles, mean (std. dev.)		14 (29)	29 (37)	45%	18 (32)
	Missing, No. (%)	5910 (1%)	1837 (1%)	0.5%	7747 (1%)

Std. Diff, standardized difference; No., number; std. dev., standard deviation; y, year; VHA, Veterans Health Administration

Table 2.

Hospital Setting/Payer and Distance to Hospital by Rurality Before and After the VCP

Hospital Setting/Payer		Proportion of admissions			
		Pre-VCP 2012–2014		Post-VCP 2015–2017	
		Urban	Rural	Urban	Rural
Medicare		57.0%	60.0%	58.8%	61.1%
	Elective	54.6%	58.6%	54.8%	57.9%
	Non-Elective	57.5%	60.4%	59.6%	61.9%
VHA		23.8%	19.7%	21.9%	18.4%
	Elective	22.0%	17.9%	21.5%	17.8%
	Non-Elective	24.2%	20.2%	22.0%	18.6%
Commercial		7.2%	7.8%	6.4%	6.9%
	Elective	11.0%	10.3%	9.9%	9.5%
	Non-Elective	6.5%	7.2%	5.8%	6.3%
VHA-Paid		4.2%	4.0%	5.2%	5.4%
	Elective	3.5%	3.0%	5.0%	4.9%
	Non-Elective	4.3%	4.3%	5.2%	5.5%
Medicaid		2.1%	1.5%	2.3%	1.8%
	Elective	1.2%	1.1%	1.3%	1.5%
	Non-Elective	2.2%	1.6%	2.5%	1.9%
Other		5.7%	7.0%	5.5%	6.4%
	Elective	7.7%	9.1%	7.5%	8.5%
	Non-Elective	5.3%	6.5%	5.1%	5.9%
		Distance to Hospital in Miles, mean (std. dev.)			
		Urban	Rural	Urban	Rural
Medicare		9.6 (24.4)	20.5 (30.9)	10.3 (24.8)	23.3 (32.5)
	Elective	13.9 (27.7)	27.9 (34.9)	15.1 (28.9)	31.6 (36.9)
	Non-Elective	8.8 (23.6)	18.8 (29.6)	9.5 (23.9)	21.5 (31.2)
VHA		22.0 (24.7)	52.3 (36.4)	22.8 (24.9)	52.1 (36.4)
	Elective	26.9 (28.9)	59.6 (41.3)	27.2 (28.4)	59.5 (42.1)
	Non-Elective	21.1 (23.8)	50.7 (35.1)	22.0 (24.1)	50.5 (34.8)
Commercial		13.6 (32.8)	24.8 (37.0)	14.6 (34.8)	28.7 (39.6)
	Elective	17.3 (34.8)	31.5 (40.8)	18.4 (36.2)	37.8 (45.6)
	Non-Elective	12.3 (32.0)	22.4 (35.2)	13.3 (34.2)	25.4 (36.7)
VHA-Paid		12.4 (25.8)	25.9 (31.1)	13.1 (26.7)	28.1 (34.5)
	Elective	19.5 (27.7)	40.2 (36.2)	18.6 (26.8)	37.2 (33.7)
	Non-Elective	11.3 (25.3)	23.5 (29.4)	12.0 (26.6)	26.2 (34.4)
Medicaid		13.4 (39.3)	28.4 (48.1)	14.6 (41.0)	32.9 (52.6)
	Elective	16.0 (37.8)	34.6 (49.3)	19.6 (48.1)	38.3 (43.9)
	Non-Elective	13.1 (39.5)	27.3 (47.8)	14.0 (40.1)	31.9 (54.0)

Other		14.0 (34.1)	25.0 (34.7)	15.0 (35.6)	27.2 (35.6)
	Elective	17.8 (34.1)	31.1 (36.6)	19.4 (36.3)	34.3 (36.0)
	Non-Elective	12.9 (34.0)	22.9 (33.8)	13.8 (35.2)	24.9 (35.2)

VCP, Veterans Choice Program; VHA, Veterans Health Administration; std. dev., standard deviation

Table 3.

Predicted Probability of Admission and Distance to Hospital by Setting/Payer

Predicted Probability of Admission, % (95% CI)				
Setting/Payer	**2012**		**2017**	
	Urban	**Rural**	**Urban**	**Rural**
Medicare				
Elective	58.0 (57.5–58.5)	59.0 (58.1–59.8)	58.7 (58.2–59.2)	59.7 (58.9–60.5)
Non-Elective	58.4 (58.1–58.6)	58.1 (57.5–58.6)	61.1 (60.8–61.4)	60.0 (59.5–60.6)
VHA				
Elective	22.5 (22.0–23.0)	22.2 (21.3–23.0)	20.4 (20.0–20.9)	18.5 (17.8–19.2)
Non-Elective	23.1 (22.9–23.4)	22.1 (21.6–22.7)	20.5 (20.3–20.8)	19.7 (19.2–20.2)
Commercial				
Elective	9.3 (9.0–9.6)	8.1 (7.6–8.5)	7.6 (7.3–7.8)	7.3 (6.9–7.7)
Non-Elective	6.8 (6.6–6.9)	7.4 (7.1–7.8)	5.4 (5.3–5.6)	6.1 (5.9–6.4)
VHA-Paid				
Elective	2.8 (2.7–3.0)	2.9 (2.6–3.2)	5.3 (5.0–5.7)	6.5 (5.8–7.1)
Non-Elective	4.5 (4.4–4.7)	5.0 (4.8–5.3)	5.2 (5.0–5.3)	6.3 (6.0–6.6)
Medicaid				
Elective	0.9 (0.9–1.0)	1.1 (1.0–1.3)	1.2 (1.0–1.3)	1.8 (1.6–2.1)
Non-Elective	2.0 (2.0–2.1)	1.9 (1.7–2.0)	2.1 (2.0–2.2)	2.3 (2.1–2.5)
Other				
Elective	6.4 (6.2–6.7)	6.7 (6.3–7.2)	6.9 (6.6–7.2)	6.2 (5.8–6.5)
Non-Elective	5.2 (5.1–5.3)	5.4 (5.2–5.7)	5.6 (5.5–5.8)	5.5 (5.3–5.8)
Distance to Hospital, Miles (95% CI)				
Setting/Payer	**2012**		**2017**	
	Urban	**Rural**	**Urban**	**Rural**
VHA				
Elective	26.7 (26.0–27.4)	56.9 (55.0–58.9)	27.0 (26.2–27.7)	55.0 (53.3–56.6)
Non-Elective	21.5 (21.2–21.8)	50.7 (49.6–51.8)	23.4 (22.9–23.8)	50.7 (49.6–51.8)
VHA-Paid				
Elective	18.2 (16.9–19.5)	39.2 (35.1–43.3)	17.7 (16.4–19.0)	32.3 (30.2–34.4)
Non-Elective	11.3 (10.7–11.9)	24.4 (22.8–26.0)	11.6 (11.0–12.2)	26.3 (24.7–27.9)

Predicted probabilities were estimated from a multinomial logistic regression model that adjusted for age, sex, race/ethnicity, marital status, priority group, state, rurality, continuous year, an indicator for the VCP starting in 2015, an elective indicator, and a Medicaid Expansion indicator. Predicted distances to hospitals were estimated from generalized linear models with the gamma distribution that adjusted for the same covariates except the Medicaid Expansion indicator was not included. Pr, probability; VCP, Veterans Choice Program; VHA, Veterans Health Administration; CI, confidence interval